



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/489,846	01/24/2000	Hideya Takeo	Q56532	6337

7590 02/23/2004  
Sughrue Mion Zinn Macpeak & Seas PLLC  
2100 Pennsylvania Avenue NW  
Washington, DC 20037-3202

EXAMINER

MILLER, RYAN J

ART UNIT	PAPER NUMBER
----------	--------------

2621

DATE MAILED: 02/23/2004

17

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/489,846

Applicant(s)

TAKEO, HIDEYA

Examiner

Ryan J. Miller

Art Unit

2621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5,7 and 9-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5,7 and 9-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 January 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

1. The response received on December 8, 2003 has been placed in the file and was considered by the examiner. An action on the merits follows.

#### ***Response to Arguments***

2. Applicant's arguments filed December 8, 2003 have been fully considered but they are not persuasive.

#### **37 CFR 1.75 Claim Objections**

*Summary of Argument:* The applicant argues that the amendment to claims 5 and 7 overcome the objections to the claims. The applicant further argues, with regard to claims 1, 3, 5, and 7, that the term "relating" is that of which one of ordinary skill in the art would understand it to be and that the particular way in which the one result is related to the other result need not be claimed.

*Examiner's Response:* The examiner finds the applicant's arguments persuasive. The term "relating" will be given its broadest reasonable interpretation, which is "to have a relationship or connection" (Merriam Webster's Collegiate Dictionary). The objections to claims have been withdrawn.

#### **Prior Art Rejections**

#### **35 U.S.C. 102(e) rejections**

*Summary of Argument:* The applicant argues that Rogers et al. do not teach or suggest relating a result of the processed abnormal pattern to a result of the corrected abnormal pattern. The applicant further argues that the incorporation of the radiologist's analysis with the CAD system outputs S2 does not correspond to relating the processed abnormal pattern result to the

Art Unit: 2621

corrected abnormal pattern result. The applicant also argues that the examiner has contradicted himself by citing the forming of data S3 from S2 as both the “correcting” step and the “relating” step.

*Examiner’s response:* The examiner disagrees. The incorporation of the CAD system outputs with the radiologist’s mammographic analysis is a way of relating the CAD system data to the radiologist corrected data. Using the broadest reasonable interpretation of the term “relating”, the CAD system outputs definitely have a “connection” with the radiologist’s analysis. Furthermore, regarding the assertion that the examiner contradicted himself, the examiner never stated that the step of relating the processed abnormal pattern result to the corrected abnormal pattern result corresponded to the determining of S3 in Rodgers et al. The examiner stated that the “relating” step corresponded to the step of incorporating the CAD system output with the radiologist’s mammographic analysis. The radiologist analyzes the data during two steps, to form S1 and to form S3. Therefore, the incorporation of the CAD system output and the radiologist’s mammographic analysis is the incorporation of S2 and S3.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-5, 7, and 9-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Rodgers et al. (U.S. Patent Application Publication No. US 2002/0081006 A1).

Art Unit: 2621

As applied to claim 1, Rogers et al. discloses an abnormal pattern detection processing method comprising: detecting an abnormal pattern in an image, based on inputted image information (see paragraph [0042]: The reference describes detecting microcalcifications (i.e. abnormal pattern) in a digital mammogram.); processing the detected abnormal pattern (see paragraph [0042]: The reference describes filtering the image to reduce noise and then filtering the image using an optimized difference of Gaussians (DoG) filter to enhance the microcalcifications. These first two steps correspond to determining a second set of suspicious detections, S2, described in paragraph [0014].); correcting the processed abnormal pattern, for each of a plurality of items of the inputted image information (see paragraph [0014]: The reference describes that a radiologist examines the suspicious detections of the CAD system and either rejects or accepts them (i.e. correcting the processed abnormal pattern).); relating a result of the processed abnormal pattern to a result of the corrected abnormal pattern, for each of the plurality of items of the inputted image information (see paragraph [0014]: The reference describes that the CAD system outputs, S2, are incorporated with the radiologist's analysis, S3, to optimize the overall sensitivity of detecting true positives. This incorporation is a manner of relating the result of the processed abnormal pattern to a result of the corrected abnormal pattern and achieves the goal of optimizes the overall sensitivity of the system.); and storing the plurality of processed abnormal pattern results and the plurality of corrected abnormal pattern results (see paragraph [0046]: The reference describes that the digital images are stored on a computer-readable storage medium.).

As applied to claim 2, Rogers et al. discloses that quantitative evaluation of the detection processing is performed, on the basis of the stored plurality of processed abnormal pattern results

Art Unit: 2621

and the stored plurality of corrected abnormal pattern results (see paragraphs [0014] and [0137]:

The quantitative evaluation the relating described above. The CAD system outputs are incorporated with the radiologist's analysis to optimize the overall sensitivity of detecting true positives. Further quantitative evaluations such as specificity and the positive predictive value are also determined from this data.).

As applied to claim 3, Rogers et al. discloses an abnormal pattern detection processing method comprising: detecting an abnormal pattern in an image, based on inputted image information (As described in the rejection of claim 1.); processing the detected abnormal pattern (As described in the rejection of claim 1.); performing a pattern reading assessment using the image information (see paragraph [0014]: The reference describes that a radiologist examines the suspicious detections of the CAD system and either rejects or accepts them, thus forming a third set of suspicious detections S3.); performing a pathologic assessment of the abnormal pattern (see paragraph [0014]: The reference describes that a radiologist reviews the image and reports a set of suspicious regions, S1 (i.e. a pathologic assessment of the abnormal pattern).); relating a result of the detected abnormal pattern processing and a result of the pattern reading assessment to a result of the pathologic assessment, for each of a plurality of items of the inputted image information (see paragraph [0014]: The reference describes that a set S4 is determined which is the union of S1+S3. Therefore, since S3 is formed on the basis of S1 and S2, and S4 is determined by relating S1 and S3, S4 is a relationship between a result of the detected abnormal pattern processing and a result of the pattern reading assessment to a result of the pathologic assessment.); and storing the plurality of processed detected abnormal pattern results, the

Art Unit: 2621

plurality of pattern reading assessment results and the plurality of pathologic assessment results (As described in the rejection of claim 1.).

As applied to claim 4, Rogers et al. discloses that a quantitative evaluation of the pattern reading assessment is performed, on the basis of the stored plurality of pattern reading assessment results and the stored plurality of pathologic assessment results (As described in the rejection of claim 2).

As applied to claim 5, Rogers et al. discloses an abnormal pattern detection processing system, which detects (see Fig. 1: Block 300 which represents detecting clustered microcalcifications.) and processes an abnormal pattern (see Fig. 1: Block 600 which represents processing the results) in an image represented by image information on the basis of inputted image information, comprising: a means relating a result of the detection processing to a corrected detection processing result, for each of a plurality of items of image information (see Fig. 31: The combination of blocks 50 through 70 depict that the CAD system outputs, S2, are incorporated with the radiologist's analysis to optimize the overall sensitivity of detecting true positives.), and storing the plurality of detection processing results and the plurality of corrected detection processing results (see paragraph [0046]: The reference describes the use of a 2 GB hard drive of a general-purpose computer for storing information); and evaluator means for performing quantitative evaluation of the detection processing on the basis of the plurality of results of detection processing and corrected detection processing results stored in the relating and storing means (This evaluation is the same evaluation as described in the rejection of claim 2. Since the reference describes a computerized system (see paragraph [0046]), then the computers processor acts as the evaluator means.)

As applied to claim 7, Rogers et al. discloses an abnormal pattern detection processing system, which detects and processes an abnormal pattern in an image represented by image information on the basis of inputted image information (As described in the rejection of claim 5 above.), comprising: a means relating a result of the detection processing and a result of a pattern reading assessment using the image information to a result of pathologic assessment concerning the abnormal pattern, for each of a plurality of items of the image information (As described in the rejection of claim 5 above), and storing the plurality of detection processing results, the plurality of pattern reading assessment results and the plurality of pathologic assessment results (As described in the rejection of claim 5 above.); and evaluator means for performing a quantitative evaluation of the pattern reading assessment on the basis of said plurality of pattern reading assessment results and the plurality of pathologic assessment results stored in said relating and storing means (This evaluation is the same evaluation as described in the rejection of claims 2 and 5. Since the reference describes a computerized system (see paragraph [0046]), then the computers processor acts as the evaluator means.).

As applied to claim 9, Rogers et al. discloses that the corrected abnormal pattern results comprise a determination of whether the processed abnormal pattern corresponds to at least one of a true positive, false positive, true negative and false negative (see paragraph [0137]: The reference describes the use of true positive, false positive, true negative and false negative to rate the detected clusters.).

As applied to claim 10, Rogers et al. discloses that quantitative evaluation comprises a ratio of a number of true results relative to a number of true and false results (see equations (11), (12), and (13): These equations represent sensitivity, specificity, and positive predictive value



Art Unit: 2621

(PPV), respectively, which are all a ratio of a number of true results relative to a number of true and false results.

As applied to claim 11, Rogers et al. discloses that a sensitivity of the quantitative evaluation is determined by the ratio of true positives to a sum of true positives and false negatives (see equation (11), following paragraph [0133]).

As applied to claim 12, Rogers et al. discloses a specificity of the quantitative evaluation is determined by the ratio of true negatives to a sum of true negatives and false positives (see equation (12), following paragraph [0134]).

As applied to claim 13, Rogers et al. discloses a positive predictive value of the quantitative evaluation is determined by the ratio of true positives to a sum of true positives and false negatives (see equation (13), following paragraph [0138]).

As applied to claim 14, which is representative of claims 15, Rogers et al. discloses that the processing automatically determines whether the abnormal pattern exists or not based on a result of the detection (see paragraph [0042]: As described in the rejection of claim 1 above, the reference describes filtering the image to reduce noise and then filtering the image using an optimized difference of Gaussians (DoG) filter to enhance the microcalcifications. These first two steps correspond to determining a second set of suspicious detections, S2, described in paragraph [0014]. These processing steps are performed by the CAD system and are performed automatically. The processing steps determine a set of suspicious detections, which corresponds to determining whether the abnormal pattern exists or not.).

Art Unit: 2621

As applied to claims 16 and 17, which merely call for a system for performing the method of claims 14 and 15, respectively, Rodgers et al. discloses such a system as can be seen in Fig. 1.

***Conclusion***

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan J. Miller whose telephone number is (703) 306-4142. The examiner can normally be reached on M-F 8:00-4:30.

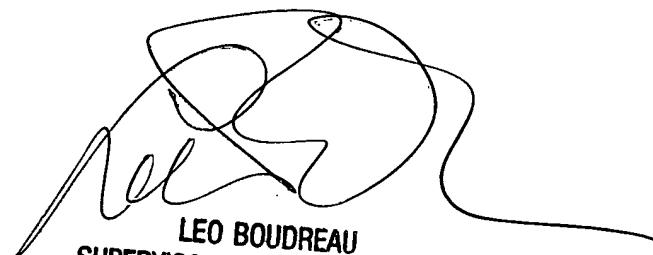
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H. Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2621

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ryan J. Miller  
Examiner  
Art Unit 2621

  
Ryan J. Miller

  
LEO BOUDREAU  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600